TEST REPORT

Applicant:	TFIVE PTY LTD
Address:	10/29 Lorne Ave Killara NSW 2071 Australia
Equipment Type:	Smart Door Lock A100
Model Name:	ZNMS02ES
Brand Name:	Aqara
Test Standard:	Radiation Protection Series S-1 (refer section 3.1)
Test Date:	Jun. 02, 2022 - Jun. 07, 2022
Date of Issue:	Jul. 04, 2022

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Chen Huiming **Checked by:** Liyao Zong **Approved by:** Wei Yanquan (Chief Engineer)

Revision History

Version	Issue Date	Revisions Content
Rev. 01	Jul. 04, 2022	Initial Issue

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe West Road, Nanshan District, ShenZhen, GuangDong Province, China
Phone Number	+86 755 6685 0100

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe West Road, Nanshan District, ShenZhen, GuangDong Province, China
Description	All measurement facilities used to collect the measurement data are located at Block B, 1/F, Baisha Science and Technology Park, Shahe West Road, Nanshan District, ShenZhen, GuangDong Province, China

2. PRODUCT INFORMATION

2.1 Applicant Information

Applicant	TFIVE PTY LTD
Address	10/29 Lorne Ave Killara NSW 2071 Australia

2.2 Manufacturer Information

Manufacturer	Lumi United Technology Co., Ltd.
Address	Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Name	Smart Door Lock A100
Model Name Under Test	ZNMS02ES
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	V1.3.1
Software Version	V0002
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	PAIRDEER
	Model No.	LR6
	Serial No.	N/A
	Capacity	2950 mAh
	Rated Voltage	N/A
	Limit Charge Voltage	N/A

2.6 Technical Information

Network and Wireless connectivity	Bluetooth (BLE), Zigbee, NFC

The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	Bluetooth (BLE), ZigBee	
Operating Frequency	Bluetooth (BLE)	2400 ~ 2483.5 MHz
	ZigBee	2400 ~ 2480 MHz
Antenna Type	Bluetooth (BLE)	PIFA Antenna
	ZigBee	PIFA Antenna
Exposure Category	General Population/Uncontrolled Exposure	
EUT Stage	Fixed Device	

3. STANDARD INFORMATION

3.1 Test Standard

No.	Identity	Document Title
1	Radiation Protection Series S-1	Standard for Limiting Exposure to Radiofrequency Fields - 100 kHz to 300 GHz
2	AS/NZS 2772.2:2016+AMD1:2018	Australian/New Zealand Standard Radiofrequency fields Part 2: Principles and methods of measurement and computation—3 kHz to 300 GHz

4. DEVICE CATEGORY AND LEVELS LIMITS

The field calculation does not take into account the antenna size, which is assumed to be a point source. An ideal isotropic antenna is used as a reference to compare the performance of practical antennas: ***P*** watts is radiated, from a point, uniformly over the surface of sphere of radius ***r***. The POINTING VECTOR gives the power density:

Assumed use distance from EUT to Human, **20 cm** separation distance warning is required. In this section, the power density at 20 cm location is calculated to examine if it is lower than the limit.

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = power density

P = output power (W)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Separation distance between radiator and human body (m)

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the following limits.

Compliance criteria

The electronic and electrotechnical apparatus shall comply with the basic restriction as specified in Annex II of Council Recommendation 1999/519/EC.

1999/519/EC Limit

Reference levels for electric, magnetic and electromagnetic fields (0 Hz to 300 GHz, unperturbed rms values)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density S_{eq} (W/m²)
0-1 Hz	—	$3{,}2 \times 10^4$	4×10^4	—
1-8 Hz	10 000	$3{,}2 \times 10^4/f^2$	$4 \times 10^4/f^2$	—
8-25 Hz	10 000	4 000/f	5 000/f	—
0,025-0,8 kHz	250/f	4/f	5/f	—
0,8-3 kHz	250/f	5	6,25	—
3-150 kHz	87	5	6,25	—
0,15-1 MHz	87	0,73/f	0,92/f	—
1-10 MHz	$87/f^{1/2}$	0,73/f	0,92/f	—
10-400 MHz	28	0,073	0,092	2
400-2 000 MHz	$1{,}375\ f^{1/2}$	$0{,}0037\ f^{1/2}$	$0{,}0046\ f^{1/2}$	f/200
2-300 GHz	61	0,16	0,20	10

5. MPE ASSESSMENT

5.1 Output Power

BLUETOOTH			
Mode	BLE		
	Low	Middle	High
EIRP (dBm)	**9.1**	9.0	9.0
ZigBee			
Mode	O-QPSK		
	Low	Middle	High
EIRP (dBm)	**9.3**	9.1	9.0
Note: This report listed the worst case EIRP power value, please refer to RF test report for more details.			

5.2 Assessment Result

Mode	Max. EIRP (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (W/m²)	Limit of Power Density (W/m²)	Verdict
Bluetooth	9.1	2.5	20	0.016	10	Pass
ZigBee	9.3	2.5	20	0.016	10	Pass

5.3 Conclusion

This EUT is deemed to comply with the reference level limits by Council Recommendation Radiation Protection Series No. 3: 2002 therefore the basic restrictions are compliant with human exposure limits.

Statement

1. The laboratory guarantees the scientificity, accuracy and impartiality of the test, and is responsible for all the information in the report, except the information provided by the customer. The customer is responsible for the impact of the information provided on the validity of the results.
2. The report without China inspection body and laboratory Mandatory Approval (CMA) mark has no effect of proving to the society.
3. For the report with CNAS mark or A2LA mark, the items marked with "☆" are not within the accredited scope.
4. This report is invalid if it is altered, without the signature of the testing and approval personnel, or without the “inspection and testing dedicated stamp” or test report stamp.
5. The test data and results are only valid for the tested samples provided by the customer.
6. This report shall not be partially reproduced without the written permission of the laboratory.
7. Any objection shall be raised to the laboratory within 30 days after receiving the report.

--END OF REPORT--